WHAT IS CLAIMED IS:

1. A channel estimation device comprising:

weighting factor generating means for generating weighting factors for weighting and averaging pilot symbols, which are time multiplexed with a control channel, which is parallel multiplexed with a data channel; and

channel estimation value calculating means for weighting and averaging said pilot symbols using said weighting factors and calculating a channel estimation value of data symbols of said data channel.

2. The channel estimation device as claimed in claim 1, wherein said weighting factor generating means generates weighting factors to be used for weighting and averaging mean values of the pilot symbols in a plurality of slots of said control channel, and said channel estimation value calculating means weights and averages the mean values of said pilot symbols using said weighting factors and calculates the channel estimation value of the data symbols of said data channel.

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3. The channel estimation device as claimed in claim 1 ~~1 or 2,~~ wherein said weighting factors are determined according to the positions of said pilot symbols in the slots of said control channel.

4. The channel estimation device as claimed in any one of claims 1 ~~1-3~~, wherein said weighting factor generating means divides the data symbols in the slots of said data channel into a plurality of data symbol sections, selects the pilot symbols appropriate for calculating the channel estimation value of the data symbols in each of the data symbol sections, and generates the weighting factors to be used for weighting and averaging the pilot symbols; and said channel estimation value calculating means takes weighted average of said pilot symbols using said weighting factors and calculates the channel estimation value of the data symbols of each of the data symbol sections.

5. The channel estimation device as claimed in claim 4, wherein in order to calculate the channel estimation value of the data symbols of the last data symbol section of the i-th (i: integer) slot and to calculate the channel estimation value of the data symbols of the first data symbol section of the (i+1)-th slot, said weighting factor generating means selects the same pilot symbol and generates the weighting factors to be used for weighting and averaging the pilot symbols.

6. The channel estimation device as claimed in any one of claims 1 ~~1-5~~, further comprising:

fading frequency decision means for deciding the fading frequency based on an inner product value of said

pilot symbols; and

factor altering means for altering the factors that are used in taking said weighted average according to the fading frequency decided by said fading frequency decision means.

7. The channel estimation device as claimed in any one of claims ~~1-6~~ 1, wherein a transmission rate of said data channel differs from the transmission rate of said control channel.

8. A demodulation device comprising:

weighting factor generating means for generating weighting factors to be used for weighting and averaging pilot symbols being time multiplexed in a control channel that was parallel multiplexed together with a data channel;

channel estimation value calculating means for weighting and averaging said pilot symbols using said weighting factors and for calculating a channel estimation value of data symbols of said data channel; and

channel variation compensating means for compensating channel variation of said data symbols using the channel estimation value calculated by said channel estimation value calculating means.

9. A fading frequency decision device comprising:

inner product value calculating means for

calculating an inner product value of pilot symbols, which are time multiplexed with a control channel, which is parallel multiplexed with a data channel; and

decision means for deciding a fading frequency based on the inner product value calculated by said inner product value calculating means.

10. The fading frequency decision device as claimed in claim 9, wherein

said inner product value calculating means comprises:

normalizing means for normalizing mean values of the pilot symbols in each of two slots of said control channel;

inner product value calculation executing means for calculating an inner product value of the mean values of the two pilot symbols normalized by said normalizing means; and

inner product value averaging means for averaging inner product values calculated by said inner product value calculation executing means over a plurality of slots of said control channel, and

said decision means comprises

decision executing means for deciding the fading frequency by comparing the inner product value averaged by said inner product value averaging means and a threshold value.

11. The fading frequency decision device as claimed in claim 10, wherein, when the inner product value averaged by said inner product value averaging means is larger than a certain constant value, said fading frequency decision device performs said normalizing, said inner product value calculation, and said inner product value averaging on mean values of the pilot symbols in each of two slots having a farther interval in said control channel, and decides the fading frequency by comparing the averaged inner product value so obtained and a threshold value corresponding to said farther interval.

12. The fading frequency decision device as claimed in claim 9, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean values of the pilot symbols in each of two slots of said control channel with respect to each of multipath signals to be used for RAKE combining;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means with respect to each of said multipath signals;

first inner product value averaging means for

averaging the inner product values of each of said multipath signals calculated by said inner product value calculation executing means; and

second inner product value averaging means for averaging the inner product values averaged by said first inner product value averaging means over a plurality of slots of said control channel, and

said decision means comprises

decision executing means for deciding the fading frequency by comparing the inner product value averaged by said second inner product value averaging means and a threshold value.

13. The fading frequency decision device as claimed in claim 12, wherein, when the inner product value averaged by said second inner product value averaging means is larger than a certain constant value, said fading frequency decision device performs said normalizing, said inner product value calculation, averaging of the inner product values of each of said multipath signals, and averaging of the inner product values over said plurality of slots on the mean values of the pilot symbols in each of two slots having a farther interval in said control channel, and decides the fading frequency by comparing the averaged inner product value so obtained and a threshold value corresponding to said farther interval.

14. The fading frequency decision device as claimed in claim 9, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean values of the pilot symbols in each of two slots in said control channel;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means for two or more cases with varying inner product measuring interval; and

inner product value averaging means for averaging the inner product value calculated by said inner product value calculation executing means over a plurality of slots of said control channel with respect to each of the inner product measuring intervals, and

said decision means comprises

decision executing means for deciding the fading frequency using the inner product value for each of the inner product measuring intervals averaged by said inner product value averaging means.

15. The fading frequency decision device as claimed in claim 14, further comprising difference calculating means for calculating the difference of the inner product values for two inner product measuring intervals averaged by said

inner product value averaging means, wherein said decision executing means decides the fading frequency using also the difference calculated by said difference calculating means.

16. The fading frequency decision device as claimed in claim 9, wherein

said inner product value calculating means comprises:

normalizing means for normalizing mean values of the pilot symbols in each of two slots in said control channel with respect to each of multipath signals to be used for RAKE combining;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means for two or more cases with varying inner product measuring interval with respect to each of said multipath signals;

first inner product value averaging means for averaging the inner product values of each of said multipath signals calculated by said inner product value calculation executing means with respect to each of the inner product measuring intervals; and

second inner product value averaging means for averaging the inner product values averaged by said first inner product value averaging means over a plurality of

slots of said control channel with respect to each of the inner product measuring intervals, and

said decision means comprises

decision executing means for deciding the fading frequency using the inner product value for each of the inner product measuring intervals averaged by said second inner product value averaging means.

17. The fading frequency decision device as claimed in claim 16, further comprising difference calculating means for calculating the difference of the inner product values for two inner product measuring intervals averaged by said second inner product value averaging means, wherein said decision executing means decides the fading frequency using also the difference calculated by said difference calculating means.

18. A channel estimation device for calculating a channel estimation value of data symbols using pilot symbols in a channel in which said data symbols and said pilot symbols are time multiplexed, said channel estimation device comprising:

weighting factor generating means for dividing data symbols in a slot of said channel into a plurality of data symbol intervals, selecting pilot symbols suitable for calculation of a channel estimation value of data symbols during each data symbol interval and generating weighting

factors for weighting and averaging said pilot symbols; and

channel estimation value calculating means for weighting and averaging said pilot symbols using said weighting factors and calculating a channel estimation value of data symbols during each data symbol interval.

19. The channel estimation device as claimed in claim 18, wherein in order to calculate the channel estimation value of the data symbols in the last data symbol section in the i-th (i: integer) slot and to calculate the channel estimation value of the data symbols of the first data symbol section in the (i+1)-th slot, said weighting factor generating means selects the same pilot symbol and generates the weighting factors to be used for weighting and averaging said pilot symbols.

20. The channel estimation device as claimed in claim ~~18 or 19~~ 18, wherein said weighting factor generating means generates the weighting factors to be used for weighting and averaging mean values of the pilot symbols for each of the plurality of slots of said channel, and said channel estimation value calculating means takes weighted average of the mean values of said pilot symbols using said weighting factors and calculates the channel estimation value of the data symbols in each of the data symbol sections.

21. The channel estimation device as claimed in any one of claims 18 ~~18-20,~~ wherein said weighting factors are determined according to positions of said pilot symbols in the slots of said channel.

22. The channel estimation device as claimed in any one of claims 18 ~~18-21,~~ further comprising:

fading frequency decision means for deciding the fading frequency based on the inner product value of said pilot symbols; and

factor altering means for altering the factors to be used for taking said weighted averaging according to the fading frequency decided by said fading frequency decision means.

23. A demodulation device comprising:

weighting factor generating means for dividing data symbols in the slots of a channel into which the data symbols and pilot symbols are time multiplexed into a plurality of data symbol sections, selecting pilot symbols appropriate for calculating the channel estimation value of the data symbols in each of the data symbol sections, and generating the weighting factors to be used for weighting and averaging said pilot symbols;

channel estimation value calculating means for weighting and averaging said pilot symbols using said

weighting factors and calculating the channel estimation value of the data symbols in each of data symbol sections; and

channel variation compensating means for compensating channel variation of said data symbols using the channel estimation value calculated by said channel estimation value calculating means.

24. A fading frequency decision device comprising:

inner product value calculating means for calculating an inner product value of pilot symbols in a channel in which data symbols and said pilot symbols are time multiplexed; and

decision means for deciding a fading frequency based on the inner product value calculated by said inner product value calculating means.

25. The fading frequency decision device as claimed in claim 24, wherein

said inner product value calculating means comprises:

normalizing means for normalizing mean values of the pilot symbols in each of two slots of said channel;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means; and

inner product value averaging means for averaging the inner product values calculated by said inner product value calculation executing means over a plurality of slots of the said channel, and

said decision means comprises

decision executing means for deciding the fading frequency by comparing the inner product value averaged by said inner product value averaging means and a threshold value.

26. The fading frequency decision device as clamed in claim 25, wherein, when the inner product value averaged by said inner product value averaging means is larger than a certain constant value, said fading frequency decision device performs said normalizing, said inner product value calculation, and said inner product value averaging on mean values of the pilot symbols in each of two slots having a farther interval in said control channel, and decides the fading frequency by comparing the averaged inner product value so obtained and a threshold value corresponding to said farther interval.

27. The fading frequency decision device as claimed in claim 24, wherein

said inner product value calculating means comprises:

normalizing means for normalizing mean values

of the pilot symbols in each of two slots of said control channel with respect to each of multipath signals to be used for RAKE combining;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means with respect to each of said multipath signals;

first inner product value averaging means for averaging the inner product values of each of said multipath signals calculated by said inner product value calculation executing means; and

second inner product value averaging means for averaging the inner product values averaged by said first inner product value averaging means over a plurality of slots of said channel, and

said decision means comprises

decision executing means for deciding the fading frequency by comparing the inner product value averaged by said second inner product value averaging means and a threshold value.

28. The fading frequency decision device as claimed in claim 27, wherein, when the inner product value averaged by said second inner product value averaging means is larger than a certain constant value, said fading frequency decision device performs said normalizing, said inner

product value calculation, averaging of the inner product values of each of said multipath signals, and averaging of the inner product values over said plurality of slots on the mean values of the pilot symbols in each of two slots having a farther interval in said control channel, and decides the fading frequency by comparing the averaged inner product value so obtained and a threshold value corresponding to said farther interval.

29. The fading frequency decision device as claimed in claim 24, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean values of the pilot symbols in each of two slots of said channel;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means for two or more cases with varying inner product measuring interval; and

inner product value averaging means for averaging the inner product values calculated by said inner product value calculation executing means over a plurality of slots of said control channel with respect to each of the inner product measuring intervals, and

said decision means comprises

decision executing means for deciding the fading frequency using the inner product value for each of the inner product measuring intervals averaged by said inner product value averaging means.

30. The fading frequency decision device as claimed in claim 29, further comprising difference calculating means for calculating the difference of the inner product values for two inner product measuring intervals averaged by said inner product value averaging means, wherein said decision executing means decides the fading frequency also using the difference calculated by said difference calculating means.

31. The fading frequency decision device as claimed in claim 24, wherein

said inner product value calculating means comprises:

normalizing means for normalizing mean values of the pilot symbols in each of two slots of said channel with respect to each of multipath signals to be used for RAKE combination;

inner product value calculation executing means for calculating the inner product value of the mean values of two pilot symbols normalized by said normalizing means for two or more cases with varying inner product measuring interval with respect to each of said multipath

signals;

first inner product value averaging means for averaging the inner product value of each of said multipath signals calculated by said inner product value calculation executing means with respect to each of the inner product measuring intervals; and

second inner product value averaging means for averaging the inner product values averaged by said first inner product value averaging means over a plurality of slots of said control channel with respect to each of the inner product measuring intervals, and

said decision means comprises

decision executing means for deciding the fading frequency using the inner product value for each of the inner product measuring intervals averaged by said second inner product value averaging means.

32. The fading frequency decision device as claimed in claim 31, further comprising difference calculating means for calculating the difference of the inner product values for two inner product measuring intervals averaged by said second inner product value averaging means, wherein said decision executing means decides the fading frequency also using the difference calculated by said difference calculating means.

33. A channel estimation device that calculates a channel

estimation value of data symbols of a data channel using pilot symbols of a pilot channel which is parallel multiplexed with said data channel, said channel estimation device comprising:

weighting factor generating means for dividing data symbols in said channel into a plurality of data symbol intervals, selecting pilot symbols suitable for calculation of a channel estimation value of data symbols during each data symbol interval and generating weighting factors for weighting and averaging said pilot symbols; and

channel estimation value calculating means for weighting and averaging said pilot symbols using said weighting factors and calculating a channel estimation value of data symbols during each data symbol interval.

34. The channel estimation device as claimed in claim 33, wherein said weighting factor generating means generates the weighting factors to be used for weighting and averaging mean values of the pilot symbols in each of a plurality of sections in said pilot channel, and said channel estimation value calculating means takes weighted average of the mean values of said pilot symbols using said weighting factors and calculates the channel estimation value of the data symbols in each of the data symbol sections.

35. The channel estimation device as claimed in claim ~~33 or 34,~~ 33 further comprising:

fading frequency decision means for deciding the fading frequency based on the inner product value of said pilot symbols; and

factor altering means for altering the factors to be used for taking said weighted average according to the fading frequency decided by said fading frequency decision means.

36. The channel estimation device as claimed in any one of claims ~~33-35,~~ 33 wherein a transmission rate of said data channel differs from the transmission rate of said pilot channel.

37. A demodulation device comprising:

weighting factor generating means for dividing data symbols of a data channel into a plurality of data symbol sections, selecting pilot symbols of a pilot channel that was parallel multiplexed together with said data channel, appropriate for calculating the channel estimation value of the data symbols in each of the data symbol sections, and generating weighting factors to be used for weighting and averaging the pilot symbols;

channel estimation value calculating means for weighting and averaging said pilot symbols using said weighting factors and calculating the channel estimation

value of the data symbols of each of the data symbol sections; and

channel variation compensating means for compensating the channel variation of said data symbols using the channel estimation value calculated by said channel estimation value calculating means.

38. A fading frequency decision device comprising:

inner product value calculating means for calculating an inner product value of pilot symbols in a pilot channel which is parallel multiplexed with a data channel; and

decision means for deciding a fading frequency based on the inner product value calculated by said inner product value calculating means.

39. The fading frequency decision device as claimed in claim 38, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean value of the pilot symbols in each of two sections of said pilot channel;

inner product value calculation executing means for calculating an inner product value of mean values of the two pilot symbols normalized by said normalizing means; and

inner product value averaging means for averaging the inner product values calculated by said inner product value calculation executing means over a plurality of sections of said channel, and

said decision means comprises

decision executing means for deciding the fading frequency by comparing the inner product value averaged by said inner product value averaging means and a threshold value.

40. The fading frequency decision device as claimed in claim 39, wherein, when the inner product value averaged by said inner product value averaging means is larger than a certain constant value, said frequency decision device performs said normalizing, said inner product value calculation, and said averaging of the inner product values with respect to the mean values of the pilot symbols in each of two sections having a farther interval in said pilot channel, and decides the fading frequency by comparing the averaged inner product value so obtained and a threshold value corresponding to the farther interval.

41. The fading frequency decision device as claimed in claim 38, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean

values of the pilot symbols in each of the two sections of said pilot channel with respect to each of multipath signals to be used for RAKE combining;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means with respect to each of said multipath signals;

first inner product value averaging means for averaging the inner product values of respective paths of said multipath calculated by said inner product value calculation executing means; and

second inner product value averaging means for averaging the inner product values averaged by said first inner product value averaging means over a plurality of sections of said pilot channel, and

said decision means comprises

decision executing means for deciding the fading frequency by comparing the inner product value averaged by said second inner product value averaging means and a threshold value.

42. The fading frequency decision device as claimed in claim 41, wherein, when the inner product value averaged by said second inner product value averaging means is larger than a certain constant value, said fading frequency decision device performs said normalizing, said inner

product value calculation, averaging of the inner product values of each of said multipath signals, and averaging of the inner product values over said plurality of sections with respect to the mean values of the pilot symbols in each of two sections having a farther interval in said pilot channel, and decides the fading frequency by comparing the averaged inner product value so obtained and a threshold value corresponding to said farther interval.

43. The fading frequency decision device as claimed in claim 38, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean values of the pilot symbols in each of the two sections of said pilot channel;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means for two or more cases with varying inner product measuring interval; and

inner product value averaging means for averaging the inner product vales calculated by said inner product value calculation executing means over a plurality of sections of said control channel with respect to each of the inner product measuring intervals, and

said decision means comprises

fading frequency decision means for deciding the fading frequency using the inner product value for each of the inner product measuring intervals averaged by said inner product value averaging means.

44. The fading frequency decision device as claimed in claim 43, further comprising difference calculating means for calculating the difference of the inner product values for the two inner product measuring intervals averaged by said inner product value averaging means, wherein said decision executing means decides the fading frequency using also the difference calculated by said difference calculating means.

45. The fading frequency decision device as claimed in claim 38, wherein

said inner product value calculating means comprises:

normalizing means for normalizing the mean values of the pilot symbols in each of the two sections of said pilot channel with respect to each of multipath signals to be used for RAKE combining;

inner product value calculation executing means for calculating the inner product value of the mean values of the two pilot symbols normalized by said normalizing means for two or more cases with varying inner product measuring interval with respect to each of said

multipath signals;

first inner product value averaging means for averaging the inner product value for each path of said multipath calculated by said inner product value calculation executing means with respect to each of the inner product measuring intervals; and

second inner product value averaging means for averaging the inner product values averaged by said first inner product value averaging means for a plurality of sections of said control channel with respect to each of the inner product measuring intervals, and

said decision means comprises

decision executing means for deciding the fading frequency using the inner product value for each of the inner product measuring intervals averaged by said second inner product value averaging means.

46. The fading frequency decision device as claimed in claim 45, further comprising difference calculating means for calculating the difference of the inner product values for two inner product intervals averaged by said second inner product value averaging means, wherein said decision executing means decides the fading frequency also using the difference calculated by said difference calculating means.

47. A method for estimating a channel, comprising the

steps of:

generating weighting factors to be used for weighting and averaging pilot symbols being time multiplexed in a control channel that was parallel multiplexed together with a data channel; and

averaging said pilot symbols using said weighting factors and calculating a channel estimation value of data symbols of said data channel.

48. A method for deciding the fading frequency, comprising the steps of:

calculating an inner product value of pilot symbols being time multiplexed in a control channel that was parallel multiplexed together with a data channel; and

deciding the fading frequency based on said inner product value.

49. A channel estimation method for calculating a channel estimation value of data symbols using pilot symbols in a channel in which said data symbols and pilot symbols are time multiplexed, comprising the steps of:

dividing the data symbols in the slots of said channel into a plurality of data symbol sections, selecting the pilot symbols appropriate for acquiring the channel estimation value of the data symbols in each of the data symbol sections, and generating weighting factors to be used for weighting and averaging the pilot symbols; and

weighting and averaging said pilot symbols using said weighting factors and calculating the channel estimation value of the data symbols in each of the data symbol sections.

50. A method for deciding the fading frequency, comprising the step of:

calculating an inner product value of pilot symbols in a channel in which data symbols and pilot symbols are time multiplexed; and

deciding the fading frequency based on said inner product value.

51. A channel estimation method for calculating a channel estimation value of data symbols of a data channel using pilot symbols of a pilot channel that was parallel multiplexed together with said data channel, comprising the steps of:

dividing the data symbols of said data channel into a plurality of data symbol sections, selecting pilot symbols appropriate for calculating the channel estimation value of the data symbols in each of the data symbol sections, and generating weighting factors to be used for weighting and averaging the pilot symbols; and

weighting and averaging said pilot symbols using said weighting factors and calculating the channel estimation value of the data symbols in each of the data symbol

sections.

52. A method for deciding the fading frequency, wherein the fading frequency is decided based on an inner product value of pilot symbols of a pilot channel that was parallel multiplexed together with a data channel.

53. A demodulation device comprising:

channel estimating means for deriving N (N is natural number greater than or equal to two) in number of channel estimation values by weighted averaging of pilot signals in time using N in number of weighted sequences;

compensating means for compensating data sequences using said respective channel estimation values;

RAKE combining means for RAKE combining respective of said N data sequences after compensation; and

reliability judgment means for selecting one data sequence having highest reliability from said N data sequences after RAKE combination.

54. A demodulation device comprising:

channel estimating means for deriving N (N is natural number greater than or equal to two) in number of channel estimation values by weighted averaging of pilot signal in time using N in number of weighted sequences for data sequences of predetermined frame number;

compensating means for compensating data sequence

using said respective channel estimation values;

RAKE combining means for RAKE combining of said N data sequences after compensation; and

reliability judgment means for selecting N' (N': natural number, N' < N) in number of weighting sequences from said N data sequence after RAKE combining and selecting one data sequence having the highest reliability from N data sequences,

selection of said N' weighting sequences being performed per a predetermined period, for remaining data sequences until performing said reliability judgement again said channel estimation means deriving N' channel estimation value by weighted averaging in time using N' weighting sequences, said compensating means compensating data sequences using N' channel estimation values, said RAKE combining means RAKE combining respective of N' data sequences after compensation, and said reliability judgment means selecting one data sequence having the highest reliability from said N' data sequences.

55. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of said data sequence comprises: error-correction decoding means for performing error-correction decoding of the data sequence after said RAKE combination;

CRC (Cyclic Redundancy Check) bit extracting means

for extracting CRC bits added to said data sequence; CRC decoding means for decoding the CRC for said data sequence;

frame error detecting means for detecting the presence or absence of a frame error based on a decoding result of said CRC;

number-of-frame-error counting means for counting said number of the frame errors in a previously-determined measuring time; and

weight sequence and data selecting means for selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said counting result of the frame errors.

56. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of the data sequence comprises:

error-correction decoding means for performing error-correction decoding of the data sequence after said RAKE combination;

likelihood information extracting means for extracting likelihood information that is calculated when performing the error-correction decoding of each of the data sequences;

likelihood averaging means for averaging said extracted likelihood information for a previously-

determined measuring time; and

weight sequence and data selecting means for selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said averaged likelihood information.

57. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of the data sequence comprises:

electric power calculating means for calculating electric power of each of the data sequences after said RAKE combination;

electric power averaging means for averaging said calculation result of the electric power for a previously-determined measuring time; and

weight sequence and data selecting means for selecting the weight sequence having high reliability and data sequence that is demodulated using the weight sequence so selected based on said averaged electric power.

58. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of the data sequence comprises:

signal-to-noise ratio(ratio of a signal power to a noise power) calculating means for calculating a signal-to-noise ratio of each of the data sequences after

said RAKE combination;

signal-to-noise ratio averaging means for averaging the calculation result of said signal-to-noise ratio for a previously-determined measuring time; and

weight sequence and data selecting means for selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said averaged signal-to-noise ratio.

59. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of the data sequence comprises:

error-correction decoding means for performing error-correction decoding of the data sequence after said RAKE combination;

CRC bit extracting means for extracting CRC bits added to said data sequence;

CRC decoding means for decoding the CRC for said data sequence;

frame error detecting means for detecting the presence or absence of a frame error based on a decoding result of said CRC;

number-of-frame-error counting means for counting the number of said frame errors in a previously-determined measuring time;

likelihood information extracting means for

extracting likelihood information that is calculated when performing error-correction decoding of each of the data sequences;

likelihood averaging means for averaging said extracted likelihood information for a previously-determined measuring time; and

weight sequence and data selecting means for selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said counted number of frame errors of the plurality of data sequences and said averaged likelihood information.

60. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of the data sequence comprises:

error-correction decoding means for performing error-correction decoding of the data sequence after said RAKE combination;

CRC bit extracting means for extracting CRC bits added to said data sequence;

CRC decoding means for decoding the CRC for said data sequence;

frame error detecting means for detecting the presence or absence of a frame error based on a decoding result of said CRC;

number-of-frame-error counting means for counting

said number of the frame errors in a previously-determined measuring time;

electric power calculating means for calculating electric power of each of the data sequences after said RAKE combination;

electric power averaging means for averaging said calculation result of the electric power for a previously-determined measuring time; and

weight sequence and data selecting means for selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said number of frame errors and said averaged electric power.

61. The demodulation device as claimed in claim 53 or 54, wherein said reliability judging means for judging reliability of the data sequence comprises:

error-correction decoding means for performing error-correction decoding of the data sequence after said RAKE combination;

CRC bit extracting means for extracting CRC bits added to said data sequence;

CRC decoding means for decoding the CRC for said data sequence;

frame error detecting means for detecting the presence or absence of a frame error based on a decoding result of said CRC;

number-of-frame-error counting means for counting said number of the frame errors in a previously-determined measuring time;

signal-to-noise ratio calculating means for calculating a signal-to-noise ratio (ratio of a signal power to a noise power) of each of the data sequences after said RAKE combination;

signal-to-noise ratio averaging means for averaging the calculation result of said signal-to-noise ratio for a previously-determined measuring time; and

weight sequence and data selecting means for selecting weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said number of frame errors and said averaged signal-to-noise ratio.

62. A demodulation device comprising:

channel estimating means for weighted averaging of reception pilot signal using a plurality of weighting sequences and deriving a plurality of channel estimation values;

demodulating means for inputting data sequences and outputting a plurality of demodulated data sequences using said plurality of channel estimation values; and

reliability judging means for selecting one demodulated data by making judgment of reliability of said plurality of demodulated data sequences.

63. The demodulation device as claimed in claim 62, wherein

said reliability judging means comprises selecting means for selecting predetermined number of the weight sequences from among said plurality of weight sequences based on a judgment result of reliability of said plurality of demodulated data sequences, and

said demodulating means performs the demodulation using only said predetermined number of the weight sequences, when said predetermined number of the weight sequences were selected.

64. The demodulation device as claimed in any one of claims ~~53-63~~ 53, 64 OR 62, wherein said pilot signals are time multiplexed in a control channel that was parallel multiplexed together with a data channel in which said data sequence is contained.

65. The demodulation device as claimed in any one of claims 53-63, wherein said pilot signals are time multiplexed in one channel together with said data sequence.

66. The demodulation device as described in claim 65, wherein said channel estimating means divides the data sequence in the slots of said channel into a plurality of

data sequence sections, selects pilot signals appropriate for calculating the channel estimation value of the data in each of the data sequence sections, and calculates the channel estimation value of the data of each of the data sequence sections by weighting and averaging the selected pilot signals.

67. The demodulation device as claimed in any one of claims ~~53-63~~ 53, 54 OR 62, wherein said pilot signals are contained in a pilot channel that was parallel multiplexed together with the data channel containing said data sequence.

68. The demodulation device as claimed in claim 67, wherein said channel estimating means divides said data sequence into a plurality of data sequence sections, selects pilot signals appropriate for calculating the channel estimation value of the data in each of the data sequence sections, and calculates the channel estimation value of the data in each of the data sequence sections by weighting and averaging the selected pilot signals.

69. A demodulation method comprising:

the step of obtaining N pieces of channel estimation values by time-weighting and averaging the pilot signals using N (N: natural number greater than or equal to 2) sets of weight sequences;

the step of compensating data sequence using each

of said channel estimation values;

the step of RAKE combining each of the N sets of the data sequences after said compensation; and

the reliability judgment step of selecting one set of the data sequences having the highest reliability from among the N sets of the data sequences after said RAKE combination.

70. A demodulation method comprising:

the step of obtaining N (N: natural number greater than or equal to 2) pieces of channel estimation values by time-weighting and averaging pilot signals using N sets of weight sequences with respect to a previously-determined number of frames of data sequence;

the step of compensating the data sequence using each of said channel estimation values;

the step of RAKE combining each of N sets of the data sequences after said compensation; and

the reliability judgment step of selecting N' (N': natural number; N'<N) sets of the weight sequences having high reliability from among said N sets of the data sequences after said RAKE combination and selecting one set of data sequence having the highest reliability from among the N sets of the data sequences after said RAKE combination,

wherein the selection of said N' sets of the weight sequences is conducted at regular intervals, and

throughout a period up to a time when said judgment of reliability is made next time, with respect to remaining part of the data sequence, in said step of estimating the channel, N′ pieces of the channel estimation values are obtained by time-weighting and averaging the data sequence using the N′ sets of the weight sequences; in said step of compensating, the data sequence is compensated using the N′ pieces of the channel estimation values; in said step of the RAKE combination, each of the N′ sets of the data sequences after the compensation is RAKE combined; and in said reliability judgment step, one set of the data sequence having the highest reliability is selected from among the N′ sets of the data sequences.

71. The demodulation method as claimed in claim 69 or 70, wherein said reliability judgment step comprises the steps of:

error-correction decoding the data sequence after said RAKE combination;

extracting CRC bits added to said data sequence;

decoding the CRC with respect to said data sequence;

detecting the presence or absence of a frame error based on said demodulation result of the CRC;

counting the number of said frame errors in a previously-determined measuring time; and

selecting the weight sequence having high reliability and the data sequence that is demodulated using

the weight sequence so selected based on said counting result of the frame errors.

72. The demodulation method as claimed in claim 69 or 70, wherein said reliability judgment step comprises the steps of:

error-correction decoding the data sequence after said RAKE combination;

extracting likelihood information calculated when performing error-correction decoding of each of the data sequence;

averaging said extracted likelihood information for a previously-determined measuring time; and

selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said averaged likelihood information.

73. The demodulation method as claimed in claim 69 or 70, wherein said reliability judgment step comprises the steps of:

calculating electric power of each of the data sequences after said RAKE combination;

averaging the calculation result of said electric power for a previously-determined measuring time; and

selecting the weight sequence having high reliability and the data sequence that is demodulated using

the weight sequence so selected based on said averaged electric power.

74. The demodulation method as claimed in claim 69 or 70, wherein said reliability judgment step comprises the steps of:

calculating a signal-to-noise ratio of each of the data sequences after said RAKE combination;

averaging the calculation result of said signal-to-noise ratios for a previously-determined measuring time; and

selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said averaged signal-to-noise ratio.

75. The demodulation method as claimed in claim 69 or 70, wherein said reliability judgment step comprises the steps of:

performing error-correction decoding of the data sequences after said RAKE combination;

extracting CRC bits added to said data sequence; decoding the CRC with respect to said data sequence;

detecting the presence or absence of a frame error based on said decoding result of the CRC;

counting said number of the frame errors in a previously-determined measuring time;

extracting likelihood information that is calculated when performing error-correction d decoding of each of the data sequences;

averaging said extracted likelihood information for a previously-determined measuring time; and

selecting the weight sequence having high reliability and the data sequence that is demodulated using the weight sequence so selected based on said measured number of the frame errors of the plurality of the data sequences and said averaged likelihood information.

76. The demodulation method as claimed in either of claim 69 or 70, wherein said reliability judgment step comprises the steps of:

error-correction decoding said data sequences after said RAKE combination;

extracting CRC bits added to said data sequence;

decoding the CRC with respect to said data sequence; detecting the presence or absence of a frame error based on the decoding result of said CRC;

counting the number of said frame errors in a previously-determined measuring time;

calculating electric power of each of received data sequences after said RAKE combination;

averaging the calculation result of said electric power for a previously-determined measuring time; and

selecting the weight sequence having high

reliability and the data sequence that is demodulated using the weight sequence so selected based on said number of frame errors and said averaged electric power.

77. The demodulation method of as claimed in claim 69 or 70, wherein said reliability judgment step comprises the steps of:

error-correction decoding said data sequences after said RAKE combination;

extracting CRC bits added to said data sequence;

decoding the CRC with respect to said data sequence;

detecting the presence or absence of a frame error based on the decoding result of said CRC;

counting the number of said frame errors in a previously-determined measuring time;

calculating a signal-to-noise ratio of each of the data sequences after said RAKE combination;

averaging calculation result of said signal-to-noise ratios for a previously-determined measuring time; and

selecting the weight sequence having a high reliability and the data sequence that is demodulated with the weight sequence so selected based on the number of said frame errors and said averaged signal-to-noise ratio.

78. A demodulation method comprising the steps of:

weighting and averaging pilot signals using a

plurality of weight sequences to obtain a plurality of channel estimation values;

deriving a plurality of demodulated data sequences from a data sequence using said plurality of channel estimation values; and

selecting one output data sequence by making judgment of reliability of said plurality of demodulated data.

79. The demodulation method as claimed in claim 78, wherein, based on the judgment result of reliability of said plurality of demodulated data sequences, a predetermined number of weight sequences are selected from among said plurality of weight sequences, and after the selection, demodulation through the use of only the selected weight sequences is performed.

80. The demodulation method as claimed in any one of claims 68, 70 OR 78 ~~69-79~~, wherein said pilot signals are time multiplexed into a control channel that is parallel multiplexed together with the data channel in which said data sequence is contained.

81. The demodulation method as claimed in any one of claims 68, 70 OR 78 ~~69-79~~, wherein said pilot signals are time multiplexed into one channel together with said data sequence.

82. The demodulation method as claimed in claim 81, wherein said step of estimating a channel divides said data sequence in the slots of said channel into a plurality of data sequence sections, selects pilot signals appropriate for calculating the channel estimation value of the data of each of the data sequence sections, and calculates a channel estimation value of the data of each of the data sequence sections by weighting and averaging the selected pilot signals.

A 83. The demodulation method as claimed in any one of claims ~~69-79~~ 69, 70 OR 78, wherein said pilot signals are contained in a pilot channel that was parallel multiplexed together with the data channel containing said data sequence.

84. The demodulation method as claimed in claim 83, wherein said step of estimating a channel divides said data sequence into a plurality of data sequence sections, selects pilot signals appropriate for calculating the channel estimation value of the data in each of the data sequence sections, and calculates the channel estimation value of the data of each of the data sequence sections by weighting and averaging the selected pilot signals.